

Application No. 10/580,654
Office Action mailed on 10/31/2007

The listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claim 1 (currently amended) A wavelength multiplexer/demultiplexer, comprising:

- at least a stratified body having a first surface being a light-receiving surface for receiving an input optical signal and a second surface being a light-exiting surface for providing at least an output optical signal, said second surface positioned in a non-parallel relationship with the first surface, wherein
- the stratified body comprises at least a plurality of regions of optically permissive material each disposed adjacent one another in a layered side-by-side relationship and being continuous between the first surface and second surface of the stratified body in order to define a stratified body, the material within each region being both uniform in index of refraction, absent any periodic variation in index of refraction within the region, and having a different index of refraction to the materials in adjacent regions, and wherein
- each of the regions has a different respective length between the first and second surfaces than any adjacent one of the regions and wherein the plurality of regions are disposed side-by-side in a lengthwise manner said stratified body having a first surface and a second surface that are positioned in a non-parallel relationship with respect to one another, said first surface being a light-receiving surface, and said second surface being a light-exiting surface.

Claim 2 (original) The wavelength multiplexer/demultiplexer defined in claim 1, wherein each of the regions has a respective face contacting a common substrate without contacting any adjacent one of the regions.

Claim 3 (canceled).

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Claim 4 (original) The wavelength multiplexer/demultiplexer defined in claim 1, wherein:

- each of the regions has a first free end and a second free end;
- the first free ends of the plurality of regions collectively define the light receiving surface;
- the second free ends of the plurality of regions define the light exiting surface.

Claim 5 (original) The wavelength multiplexer/demultiplexer defined in claim 4, wherein the light-receiving and light-exiting surfaces form substantially straight lines.

Claim 6 (original) The wavelength multiplexer/demultiplexer defined in claim 4, wherein at least one of the light-receiving and light-exiting surfaces is curvilinear.

Claim 7 (original) The wavelength multiplexer/demultiplexer defined in claim 1, wherein:

- the plurality of regions comprises a plurality of regions formed of a solid material and a plurality of regions formed of a non-solid material;
- each of the regions formed of a solid material has a first free end and a second free end;
- the first free end of each of the regions formed of a solid material collectively define the light-receiving surface;
- the second free end of at least some of the regions formed of a solid material define the light-exiting surface.

Claim 8 (original) The wavelength multiplexer/demultiplexer defined in claim 7, wherein the plurality of regions formed of a non-solid material are formed of ambient air.

Claim 9 (original) The wavelength multiplexer/demultiplexer defined in claim 8, wherein the light-receiving and light-exiting surfaces form substantially straight lines.

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Claim 10 (original) The wavelength multiplexer/demultiplexer defined in claim 8, wherein the light-receiving and light-exiting surfaces are curvilinear.

Claim 11 (original) The wavelength multiplexer/demultiplexer defined in claim 1, wherein:

- the plurality of regions comprises a first plurality of regions alternating with a second plurality of regions;
- each of the first plurality of regions has a substantially identical first width;
- each of the second plurality of regions has a substantially identical second width.

Claim 12 (original) The wavelength multiplexer/demultiplexer defined in claim 11, wherein said first width is substantially the same as said second width.

Claim 13 (original) The wavelength multiplexer/demultiplexer defined in claim 11, wherein said first width and said second width are distinct.

Claim 14 (original) The wavelength multiplexer/demultiplexer defined in claim 1, wherein;

- each of the regions has a respective length;
- at least some of said regions have a width that varies over the length of the respective region.

Claim 15 (original) The wavelength multiplexer/demultiplexer defined in claim 1, wherein at least one of said regions is curved along its length.

Claim 16 (original) The wavelength multiplexer/demultiplexer defined in claim 1, wherein each of said regions has a respective width that is less than the shortest wavelength of visible light.

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Claim 17 (original) The wavelength multiplexer/demultiplexer defined in claim 1, further comprising a cladding layer, wherein each of the regions has a respective second face contacting the cladding layer without contacting any adjacent one of the regions.

Claim 18 (original) The wavelength multiplexer/demultiplexer defined in claim 17, wherein the plurality of regions includes a first subset of regions formed of a first material, wherein said cladding layer includes a material substantially identical to the first material.

Claim 19 (original) The wavelength multiplexer/demultiplexer defined in claim 1, the wavelength multiplexer/demultiplexer further comprising:

- a first collimating structure and a second collimating structure disposed on the substrate;
- the first collimating structure being adapted to collimate an incoming polychromatic optical signal towards the light-receiving surface;
- the second collimating structure being adapted to focus an optical signal received from the light exiting surface towards an outgoing optical waveguide.

Claim 20 (currently amended) The wavelength multiplexer/demultiplexer defined in claim 19, wherein at least one of the first and second collimating structures is a lens assembly.

Claim 21 (currently amended) The wavelength multiplexer/demultiplexer defined in claim 19, wherein at least one of the first and second collimating structures is a mirror assembly.

Claim 22 (currently amended) The wavelength multiplexer/demultiplexer defined in claim 1, the wavelength multiplexer/demultiplexer further comprising:

- a first waveguide for supplying the input ~~an incoming polychromatic~~ optical signal to the light receiving surface;

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- a plurality of second waveguides for receiving a plurality of outgoing wavelength component optical signals from the light exiting surface.

Claim 23 (currently amended) The wavelength multiplexer/demultiplexer defined in claim 1 ~~[[22]]~~, further comprising:

- a plurality of first waveguides for supplying a plurality of incoming wavelength component optical signals to the light-receiving surface, the plurality of incoming wavelength component optical signals forming the input optical signal;
- a second waveguide for supplying receiving an outgoing polychromatic optical signal from the light-exiting surface, the outgoing polychromatic optical signal being the output optical signal.

Claim 24 (original) The wavelength multiplexer/demultiplexer defined in claim 19, further comprising:

- a first waveguide for supplying an incoming polychromatic optical signal to said first collimating structure.

Claim 25 (original) The wavelength multiplexer/demultiplexer defined in claim 24, further comprising:

- a plurality of second waveguides for receiving a plurality of outgoing wavelength component optical signals from said second collimating structure.

Claim 26 (original) An optical device assembly, comprising:

- a polarization filter having a first port for carrying an optical signal having a first polarization and a second port for carrying a signal having a second polarization different from the first polarization;
- a first wavelength multiplexer/demultiplexer as per claim 21 connected to the first port;
- a second wavelength multiplexer/demultiplexer as per claim 21 connected to the second port.

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Claim 27 (original) The optical device assembly defined in claim 26 ~~[[25]]~~, wherein the first and second wavelength multiplexer/demultiplexers are on separate substrates.

Claim 28 (currently amended) A wavelength multiplexer/demultiplexer, comprising:

- a substrate;
- a plurality of regions of optically transparent material positioned adjacent one another in a side-by-side relation in a lengthwise manner each region characterized by a length and by a uniform index of refraction absent any periodic variation within the region;
- adjacent ones of the regions having differing indexes of refraction and different lengths between the first and second surfaces than any adjacent region; and,
- each one of the plurality of regions having a respective face contacting the substrate without contacting an adjacent one of the plurality of regions.

Claim 29 (currently amended) A method of separating wavelength component signals from a polychromatic optical signal, comprising:

- providing the polychromatic signal at an angle of entry to a light-receiving surface of a stratified body comprising a plurality of regions of optically permissive material each disposed adjacent one another in a side by side relationship in a lengthwise manner, the material within each region being uniform in index of refraction, absent any periodic variation in index of refraction within the region, and having a different index of refraction to the materials in adjacent regions, each region having a different length between the first and second surfaces than any adjacent region having differing indexes of refraction;
- ~~providing~~ capturing a plurality of ~~[[the]]~~ wavelength component signals at different respective angles of exit relative to a light-exiting surface of the stratified body, the plurality of wavelength component signals being generated

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in dependence upon at least a wavelength spectral content of the polychromatic signal and the stratified body.